CLAIMS

I/We claim:

1. A negative charge pump formed on a semiconductor substrate comprising:

a power supply having having first terminal connected to said substrate and a second terminal connected to a high voltage rail;

an output capacitor connected between said high voltage rail and said substrate;

a plurality of charging capacitors connected between said high voltage rail and said substrate, said charging capacitors connected to said high voltage rail by a first set of transistor switches and connected to said substrate by a second set of transistor switches;

wherein said second set of switches are NMOS transistors and said first set of switches are PMOS switches.

2. The negative charge pump of Claim 1 further including a supervisory circuit operative in a shutdown mode to catch the output voltage to said negative supply voltage.

3. The negative charge pump of Claim 1 wherein at least one of said second set of switches is formed from a plurality of transistors that are staggered in switching on during a soft start mode.